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Highlights of FIRE IN THE UNITED STATES

Deaths, Injuries, Dollar Loss, and Incidents at the National, State, and Local Levels In 1978

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COMPLETED

SECOND EDITION

federal emergency management agency / U.S. fire administration

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SECOND EDITION

Federal Emergency Management Agency
U.S. Fire Administration
Gordon Vickery, Administrator

Prepared by
National Fire Data Center

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Foreword

This booklet presents the highlights of the National Fire Data Center's second comprehensive study of the magnitude and characteristics of America's fire problem. The complete report, *Fire in the United States,* will be published later this year. It will contain detailed information on many aspects of our fire problems nationally and will present a breakdown of the data from the following states as well as several major cities: Alaska, California, Illinois, Maryland, Minnesota, Missouri, Montana, New York, Ohio, Oregon, Rhode Island, South Dakota, Utah, and Wisconsin.

Watch your fire journals for the announcement of the publication date of *Fire in the United States, Second Edition.*

To receive additional free copies of this *Highlights* booklet write to J.W. Overbey, National Fire Data Center, U.S. Fire Administration, Federal Emergency Management Agency, Washington, D.C. 20472.

Highlights

The U.S. fire death rate, after many years of steady decline, went up in 1976 and again in 1977. The final figures for 1978 are not yet in, but the death rate appears to continue at the same high level. The United States along with Canada continues to have the highest fire death rate in the world.

In 1977, heating shot out front as the leading cause of fire incidents. It appears there has been an increase in the use of supplemental heating devices, such as fireplaces, woodburning stoves, and portable heaters, which are causing serious fire problems. Improper installation and maintenance of heating equipment is also part of the problem.

The purpose of this report is to describe these and other major trends in fire losses in the United States and to identify our specific fire problems in enough detail so that fire protection, fire service training, and particularly fire prevention can be targeted at the conditions, physical and human, that are causing the most damage and anguish.

The first *Fire in the United States*, published two years ago, established a baseline of data against which we can now measure progress. Our analysis for the second edition of *Fire in the United States* has had four important results. First, the major findings in our first report on the magnitude of fire losses and the leading causes of fire are further substantiated by a much larger set of data from many more fire departments and more parts of the country. Second, several trends are emerging such as the heating problem. Third, we can now compare communities in more detail, city-by-city and county-by-county. And fourth, there is now sufficient data available to begin to answer important fire protection questions such as "Do smoke detectors really save lives?", "At what type of fires do firefighters face the greatest risk?", and others.

The bulk of the fire problem in the United States can be characterized as a lot of fires each causing limited damage. Our fire departments do a good job of controlling the fires they are called to. Loss per fire is below that of most other industrialized nations. The problem is that so many fires occur—over 2.7 million destructive fires are attended by fire departments each year. When the losses from all these fires are added up, our national fire problem is one of the most serious in the industrialized world. Although they get far less attention from the press and the public, 20 times more deaths are caused by fire in this country each year than by floods, hurricanes, tornadoes, and earthquakes combined.

We clearly need to do a better job of *preventing* fires. The emergence of detailed information on the fire problem at Federal, state, and local levels provides the basis for targeting fire protection at the worst parts of our fire problem. This way, hopefully, the increasingly limited resources available for fire protection at all levels of government can be put to the best use.

Overall U.S. Fire Problem

In 1976 the number of fire fatalities in the United States increased for the first time since the beginning of the 1970's (Figure 1). There were about 300 more fatalities than in 1975. The upward trend continued in 1977 with an increase of about 100 fatalities, bringing the 1977 count to 8,500. (This includes the 165 lives lost in the Southgate, Kentucky, nightclub fire.)

Our preliminary estimate for 1978 indicates that the upward trend has probably leveled at around 8,400 fatalities—the figure could vary by 250 deaths, more or less. This estimate will be made more precise when better data becomes available.

Highlights of

FIRE IN THE UNITED STATES

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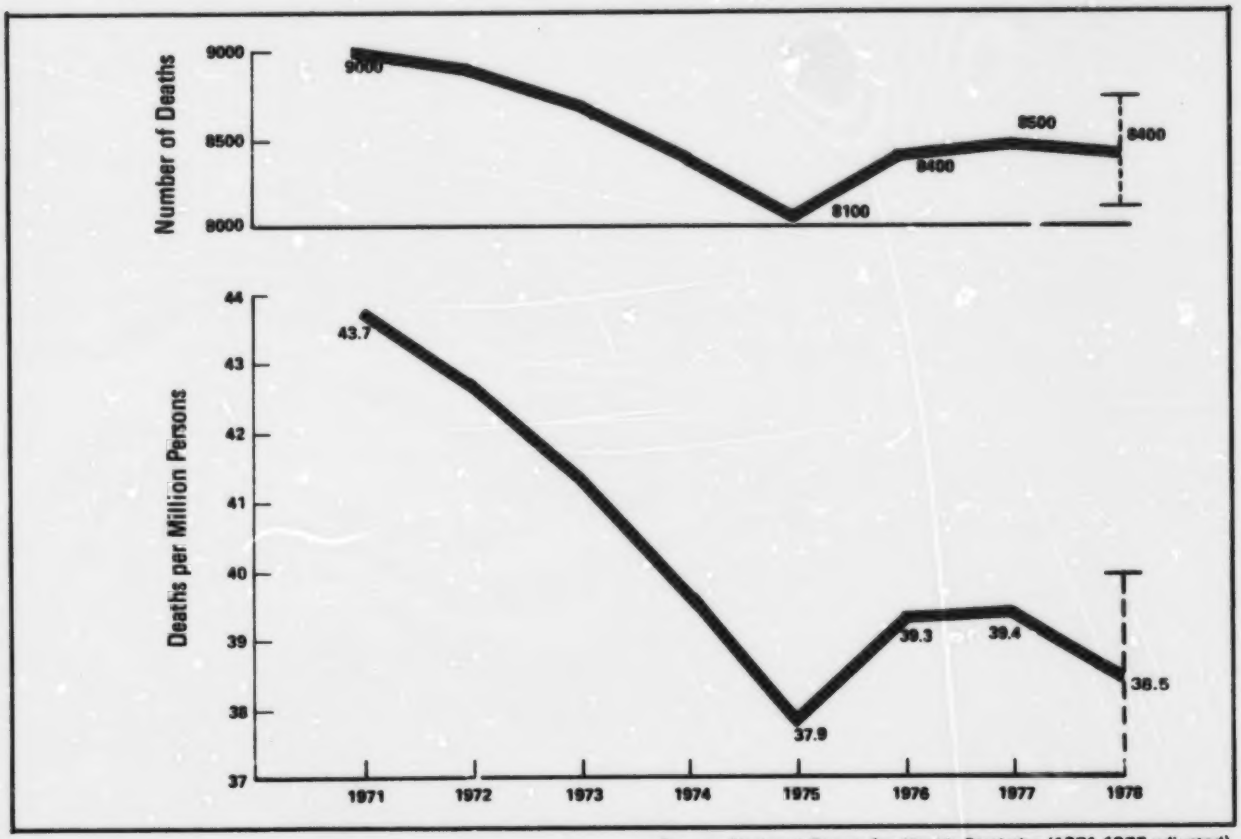
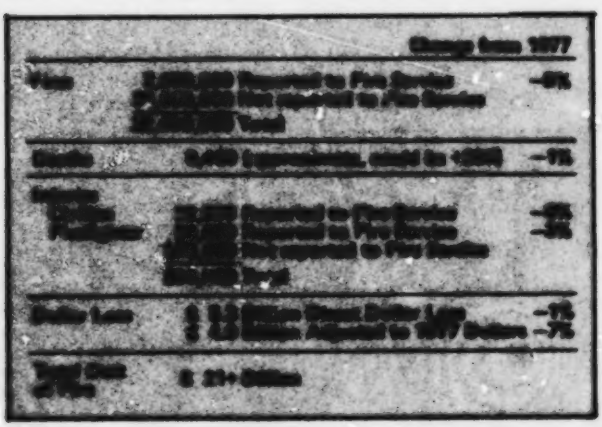
Figure 1. U.S. Fire Death Trend



Source: National Center for Health Statistics (1971-1977 adjusted), National Safety Council (1978 preliminary data), and U.S. Bureau of Census.



Not only did the number of fire fatalities increase during both 1976 and 1977 but the *per capita* fire death rate, a measure of personal risk for our citizens, also increased during these same years.

The major features of the 1978 fire problem and the change in the major fire problem measures from 1977 to 1978 are shown in the table on the left. We feel that the direction of the changes is probably correct, but we are less confident of the magnitude of those changes.

United States Compared To Other Countries

The United States and Canada have the worst fire death rates of all the industrialized countries for which we have comparable data (Figure 2). U.S. fire deaths per million population are almost twice the average of the rates for the countries shown.

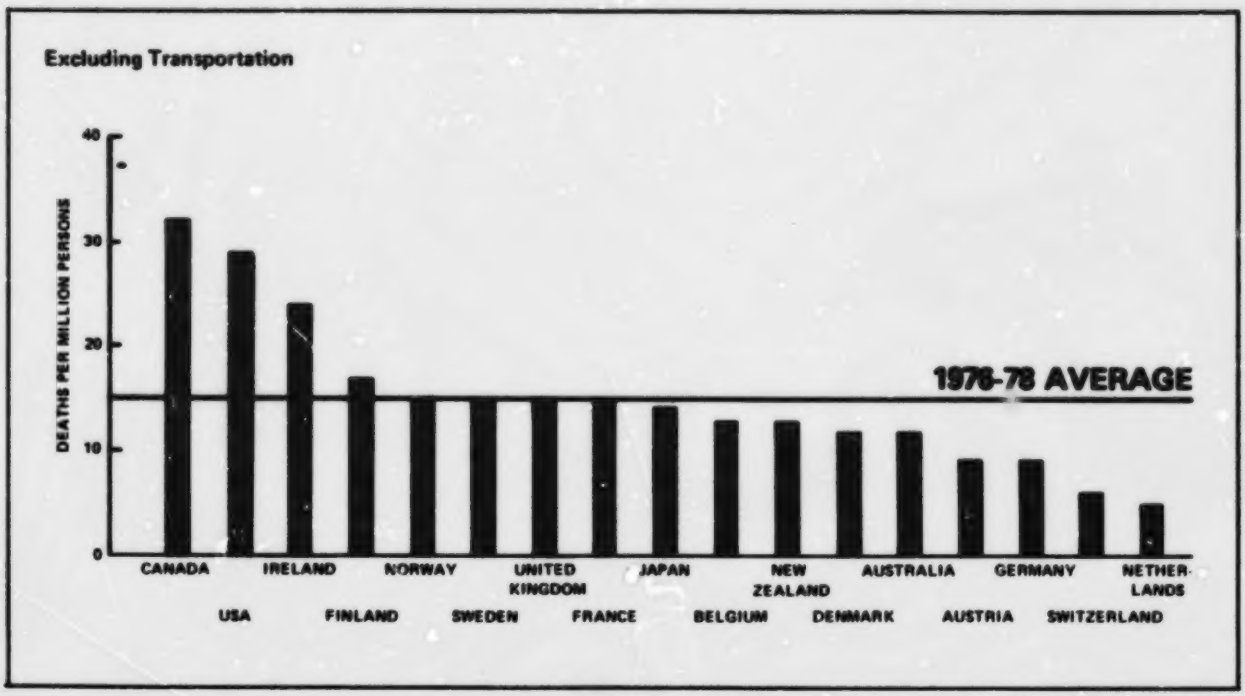
Compared to other countries, our loss—deaths and dollars—per fire is not high. However, the number of fires in the United States, even figured on a per capita basis, is very high. This suggests that our suppression efforts are relatively good and that to reduce fire deaths and dollar losses we need to concentrate on preventing fires from starting.

Where Fire Losses Occur

In setting priorities among fire protection programs the first step is to determine what kinds of fires are causing most of the loss. Figure 3 shows where the biggest shares of the total loss occur.

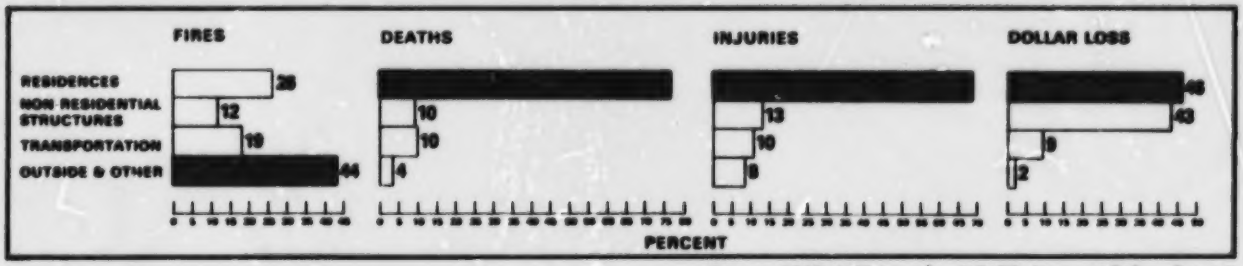
Although nearly half of the Nation's fires occur out of doors, with an additional 20% involving vehicles, these cause a relatively small proportion of fire losses. Far and away, it is fires in residential properties that cause the most deaths and the most injuries. In terms of dollar loss, again, fires in residences lead, though with non-residential buildings close behind.

Figure 2. International Fire Death Rates—1976-78



Source: Georgia Institute of Technology, 1980

Figure 3. Where Fire Losses Occur

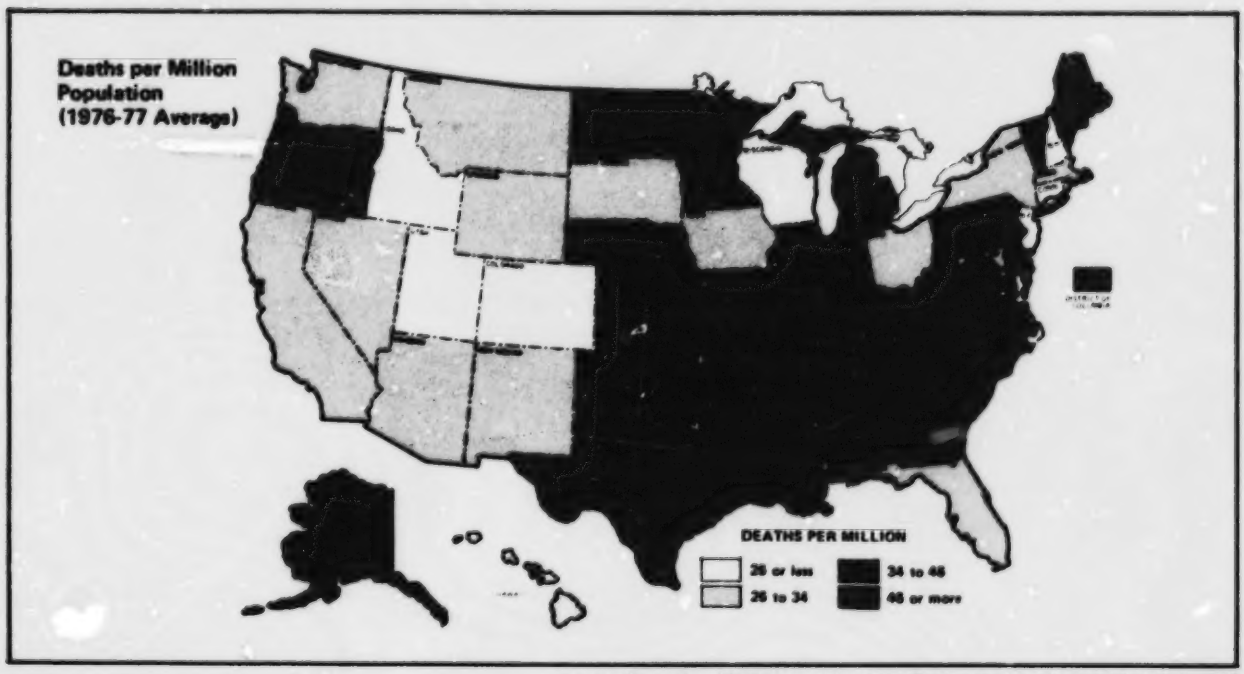


Source: 1978, NFPA survey, NFIRS, National Safety Council

Fire Problems Vary From State To State

Southern and southeastern states, Alaska, and the District of Columbia (Figure 4) have fire death rates that are the highest not only in the Nation but also in the industrialized world as well. Their death rates are much higher than New York City's. These states all have death rates of at least 46 deaths per million population, compared to New York City's rate of about 36.

Figure 4. State Fire Death Rates



Source: State Fire Marshals and National Center for Health Statistics (Adjusted)

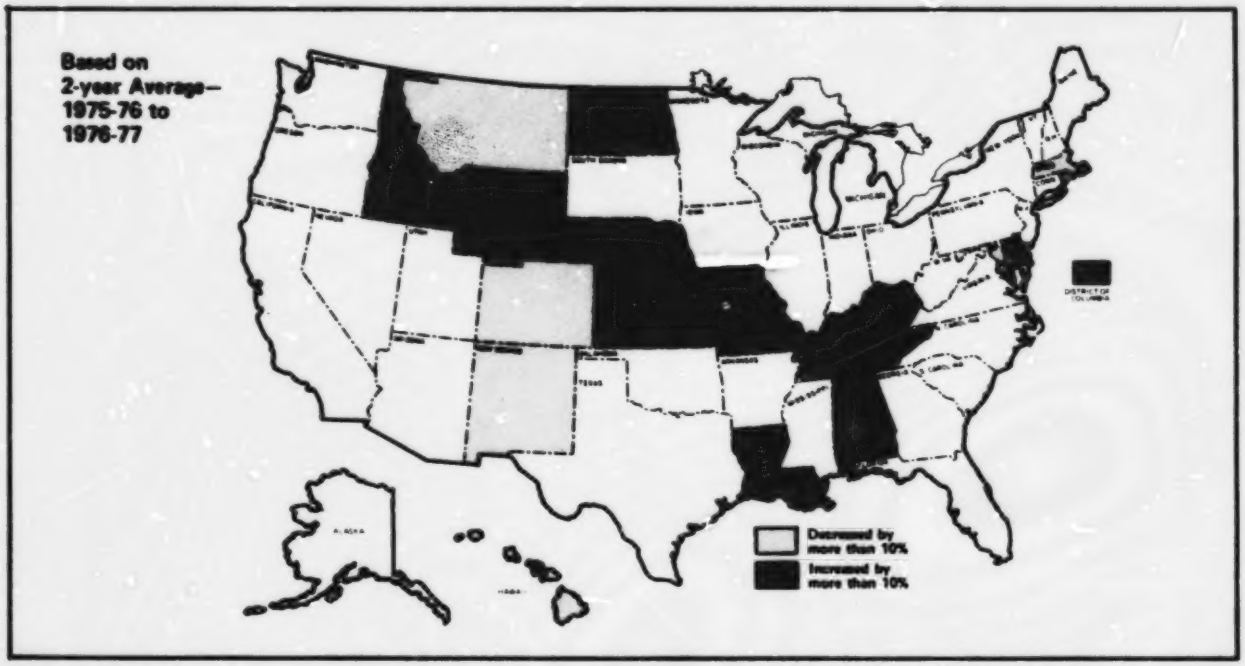
Higher death rates in the South are partly due to carelessness in using fixed room heaters and portable space heaters. In addition, we know that a large portion of the population in the South is in rural areas and that, generally, rural death rates are higher than those of urban areas, except for major cities. Also, compared to other parts of the country, larger percentages of the population in those states are below the poverty line, and fire death rates are highly correlated with poverty.

It is known that a quarter of Alaska's population lives in mobile homes. These homes normally have double the fire death rate of conventional homes. Other factors that probably contribute to high fire mortality in Alaska include a higher alcoholism rate than in other states and the need for intensive heating.

State Trends

The fire death rate is going up in some states and down in others. It is important for each state and city to track its own changes from year to year and to try to understand how these changes are related to changes in fire protection and other factors. The map in Figure 5 shows the six states which have improved and the 12 states, along with the District of Columbia, which have gotten worse by more than 10% of their original figure in terms of fire deaths per capita. (Two-year averages are used to dampen out the effect of random severe fires that might have occurred in any one year).

Figure 5. Major Changes in Fire Death Rates



Source: State Fire Marshals and National Center for Health Statistics (Adjusted)

States With Most Fatalities

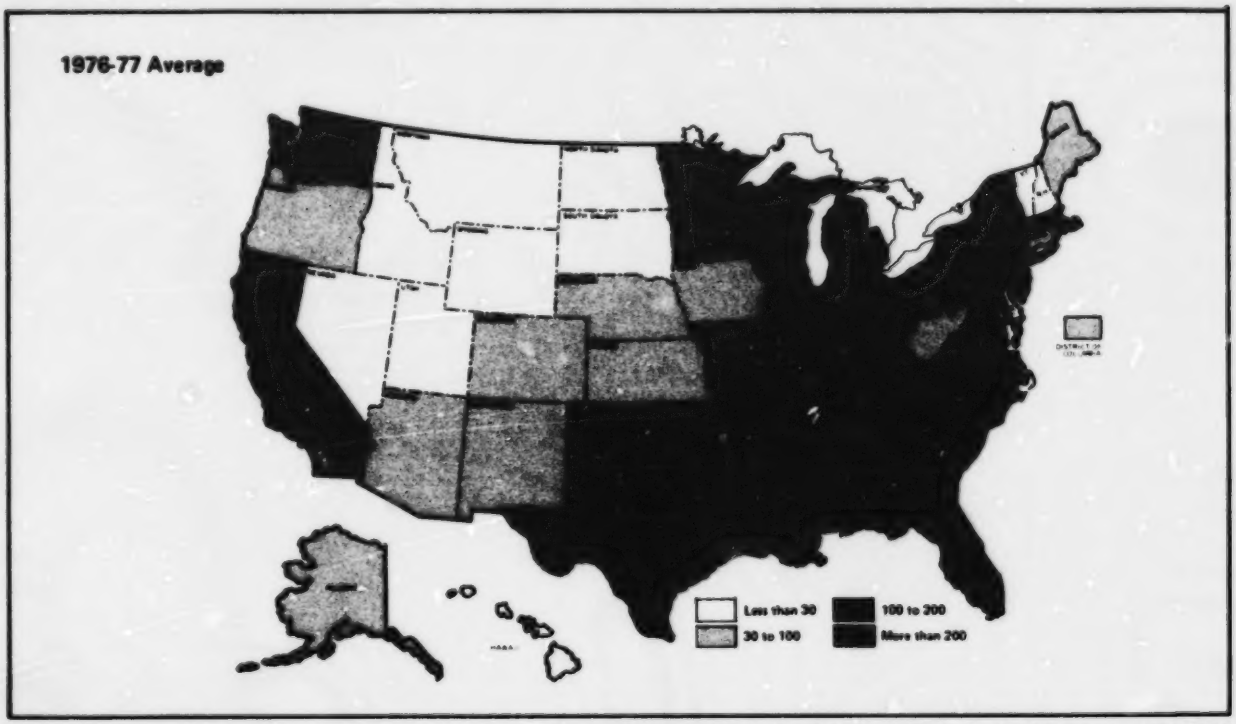
Per capita fire loss rates, described above for states, are an indicator of the average risk to each citizen in a particular area. That's the main way to see if there are inequities, with some areas enduring greater risks than others. However, it is also important to look at the absolute number of fire deaths and where they occur as an aid in pinpointing where large parts of the overall fire problem exist.

For the most part, the largest numbers of fire deaths occur in the states with the most people. In each of the seven most populous states, the average number of annual fire fatalities is more than 200 (Figure 6). These seven states are California, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas. In 1977 the deaths in these seven states accounted for more than one-third (36%) of the fire deaths in all 50 states.

However, eight less-populous states also averaged over 200 fire fatalities. Each was a southern state: Alabama, Florida, Georgia, Kentucky, Louisiana, North Carolina, Tennessee, and Virginia. The situation for these and the rest of the states in the Nation is shown in Figure 5.

Six states have both high per capita death rates and more than 200 deaths per year. They are Alabama, Georgia, Kentucky, Louisiana, North Carolina, and Tennessee. It is especially important that these states identify their fire problems and reduce their fire deaths.

Figure 6. Number of Fire Deaths By State



Source: State Fire Marshals and National Center for Health Statistics (Adjusted)

County Fire Death Patterns

Fire death rates per capita by county tell where problems concentrate within a state (see centerfold for Figure 7). In states where there are only a few high death rate counties, or where there are blocks of high death rate counties, fire protection efforts might be emphasized in those areas.

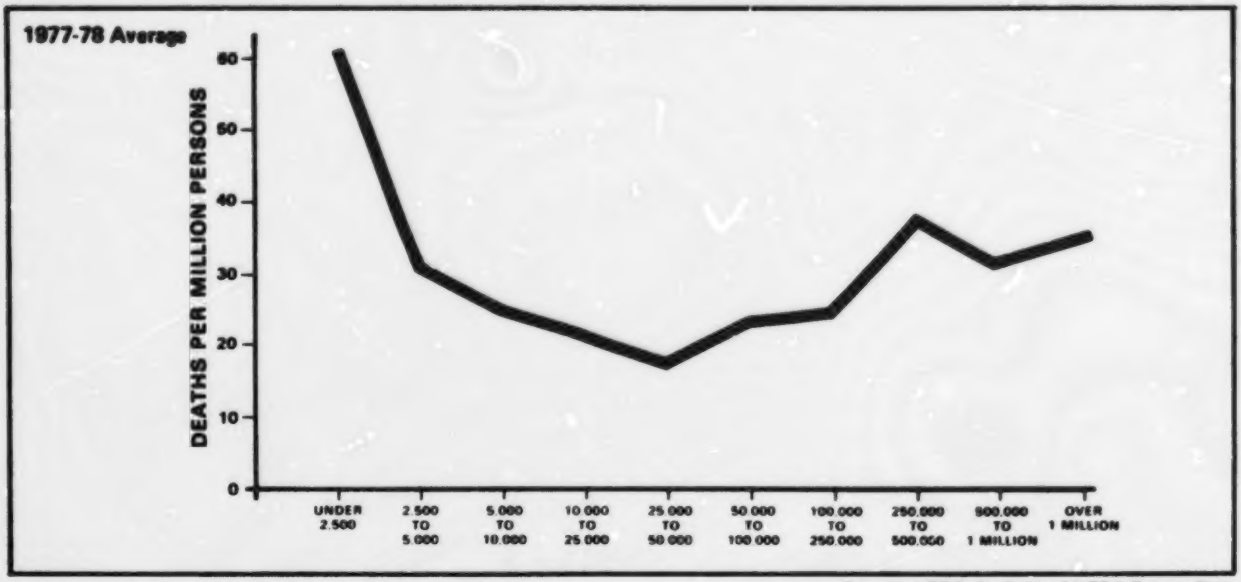
Two interesting regional patterns appear in the county fire death map. One is that there is a strip of counties along both banks of the southern half of the Mississippi River with high fire death rates. The other is a belt of high death rate counties along the Atlantic coastline of the Southeast. We don't have enough data yet to explain why these patterns occur, but it's certainly something for the states involved to look into.

Since in some cases a person injured in one county in a fire might be taken to a neighboring county for medical treatment and die there, the county fire death information is not a completely accurate representation of where death-causing fires occur. State and local officials should take this factor into consideration when using county information to decide where to target prevention or training programs. But with the data that is available we can see approximately where the worst parts of the fire death problem are within each state, and which counties, or groups of counties, need increased efforts to reduce their very serious losses.

Urban-Rural Pattern

The fire death problem is especially serious in large cities and rural communities (Figure 8). Medium-size cities have the lowest fire death

Figure 8. Residential Death Rate By Community Size



Source: USFA Analysis of NFPA Survey Data

rates. The death rates in the most rural areas are the highest, even higher than in our big cities.

Rural areas and big cities have higher dollar losses per capita from fire than do mid-size cities.

In general, the rural fire problem is as severe or more severe than the fire problem in our cities, and it deserves particular attention. The highest rural rates are found primarily in the South, while northeastern and western rural rates are lower. High fire death rates in the very rural and the very urban areas result from the combination of more fires per capita and more deaths per fire.

We have found that the highest urban death rates are found primarily in eastern and southern cities, while most western cities have somewhat lower rates (Figure 9).

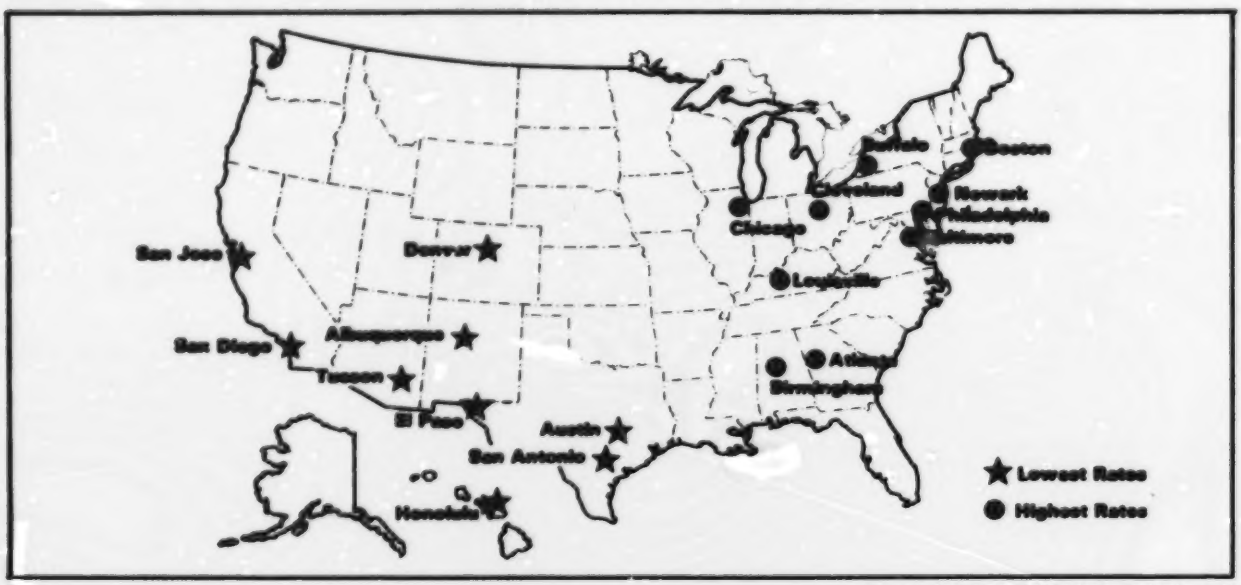
Fire Death Rates Of The Major U.S. Cities

On the next page, we present a list of the 58 cities with over 250,000 population ranked by their fire death rates. This kind of comparison is very general because of the many different circumstances from city to city, but it can be informative and useful.

Heading the list is Newark, New Jersey, with almost 65 deaths per million population. Next is Birmingham, Alabama, with a rate of nearly 60. Completing the top ten are Boston, Cleveland, Louisville, Baltimore, Atlanta, Philadelphia, Chicago, and Buffalo. All are in the East, Southeast, or Midwest. Most are decreasing in population.

At the bottom of the list, the cities with the lowest per capita fire death rates are El Paso and Honolulu. Their rates are less than one

Figure 9. Fire Death Rates-Highest and Lowest Cities



Source: NCHS, 1974-77 Average (Adapted)

Fire Death Rates - Cities Over 250,000 Population

Rank	City	Deaths Per Million 1974-1977 Average*
1	Newark, New Jersey	64.8
2	Birmingham, Alabama	58.8
3	Boston, Massachusetts	58.5
4	Cleveland, Ohio	54.0
5	Louisville, Kentucky	53.6
6	Baltimore, Maryland	53.1
7	Atlanta, Georgia	52.8
8	Philadelphia, Pennsylvania	49.9
9	Chicago, Illinois	49.5
10	Buffalo, New York	47.3
11	Washington, D.C.	46.3
12	Jersey City, New Jersey	45.1
13	Detroit, Michigan	44.8
14	Portland, Oregon	44.1
15 tied	San Francisco, California	42.9
15 tied	Tulsa, Oklahoma	42.9
17	Memphis, Tennessee	42.7
18	Pittsburgh, Pennsylvania	42.5
19	Oklahoma City, Oklahoma	42.3
20	Fort Worth, Texas	40.5
21	Indianapolis, Indiana	39.2
22 tied	Cincinnati, Ohio	38.7
22 tied	Toledo, Ohio	38.7
24	St. Paul, Minnesota	38.4
25	St. Louis, Missouri	36.7
26	Dallas, Texas	36.6
27 tied	Minneapolis, Minnesota	36.4
27 tied	New York, New York	36.4
29	Nashville, Tennessee	35.8
30	Rochester, New York	35.6
31	Wichita, Kansas	34.9
32	New Orleans, Louisiana	34.8
33	Jacksonville, Florida	33.4
34	Kansas City, Missouri	32.2
35 tied	Akron, Ohio	31.8
35 tied	Seattle, Washington	31.8
37	Norfolk, Virginia	31.4
38 tied	Charlotte, North Carolina	30.2
38 tied	Houston, Texas	30.2
38 tied	Oakland, California	30.2
41	Sacramento, California	28.7
42	Phoenix, Arizona	28.2
43	Miami, Florida	26.7
44	Columbus, Ohio	26.1
45	Los Angeles, California	25.9
46	Long Beach, California	25.3
47	Tampa, Florida	25.0
48	Omaha, Nebraska	24.3
49	Milwaukee, Wisconsin	23.6
50	Denver, Colorado	22.7
51	Albuquerque, New Mexico	22.4
52 tied	San Antonio, Texas	22.0
52 tied	Tucson, Arizona	22.0
54	San Diego, California	15.5
55	San Jose, California	14.8
56	Austin, Texas	10.0
57	El Paso, Texas	9.1
58	Honolulu, Hawaii	7.1

*Source: National Center for Health Statistics; excludes transportation fire deaths and deaths to non-residents.

eighth of the rates of the cities with the highest rates. The ten lowest cities are all in the West or Southwest; most are newer, growing cities.

At the present time it is sometimes difficult to identify deaths caused by arson fires. If complete arson fire information were available, the exact rankings might change somewhat, but given what we do know about arson-related deaths, we would not expect any radical changes in rank.

Transportation-related fire deaths were not included here. The table generally represents the death risk from fire for citizens in their own cities. The data was averaged over a 4-year period to level out the effect of a particularly bad year in any given city.

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Figure 7. County Fire Death Rates / 1974-77 Average

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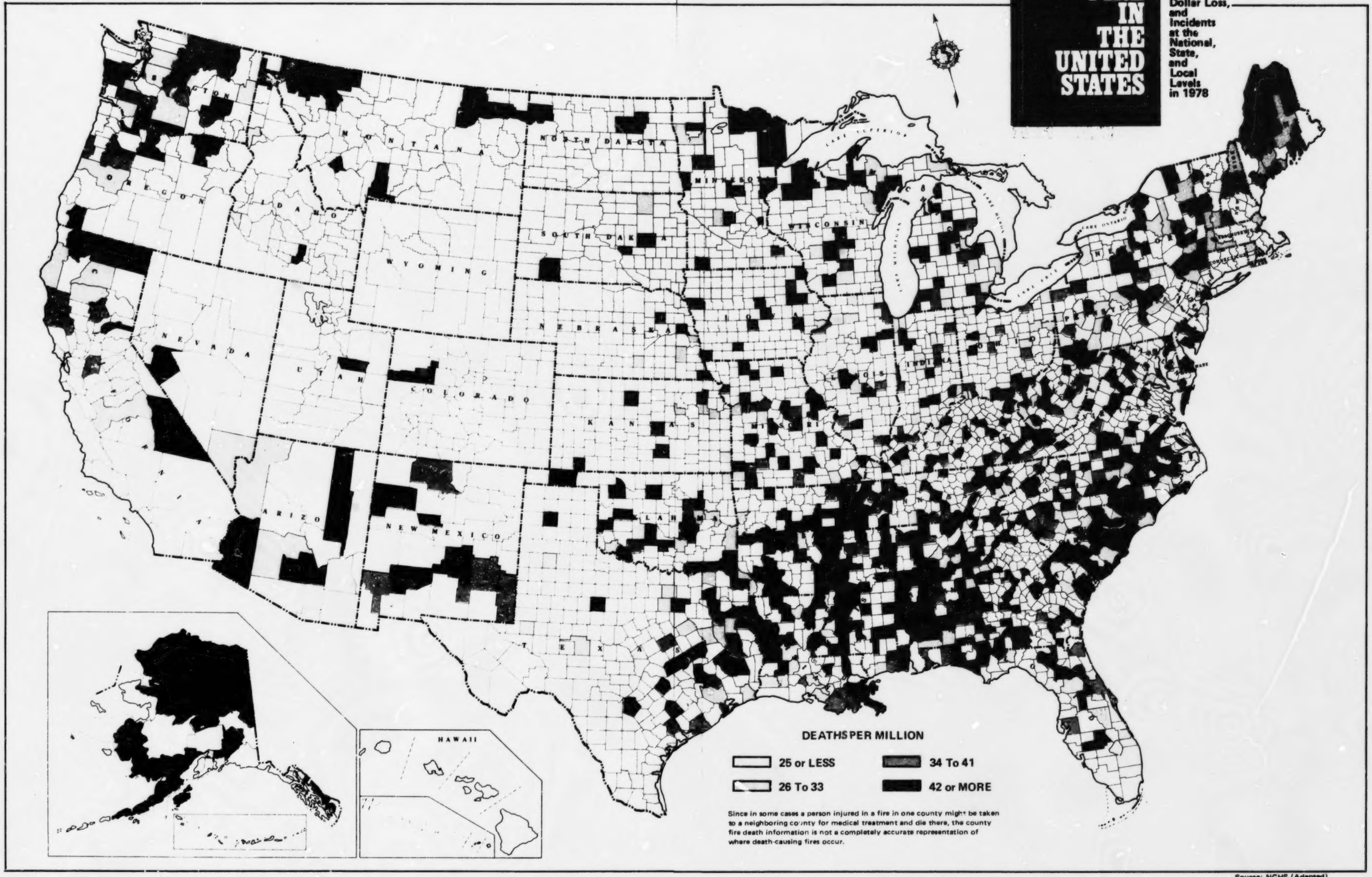

Source: NCHS (Adapted)

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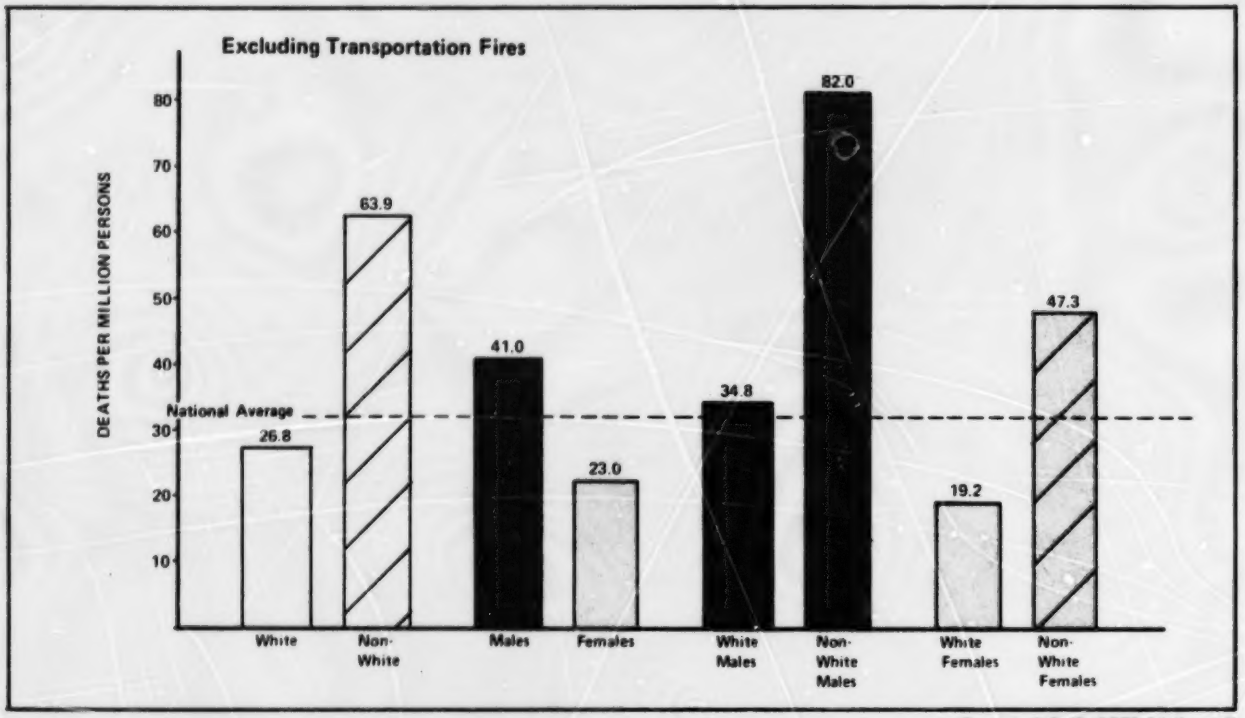
Who Gets Killed And Injured

Some key findings on civilian casualties (firefighter casualties are discussed in the next section) are as follows:

- The fire death rate for non-whites is nearly 2½ times the rate for whites (Figure 10);
- Non-white males continue to be the highest death-risk group. Non-white females and white males are next highest. White females are the lowest (safest) group.
- The death rate of non-white males is getting progressively worse, having increased 10% from 1974 to 1976. However, 1977 was slightly better — down 2%.
- Within the non-white category,Orientals are an exception and have a death rate lower than whites.
- Men (with firefighters excluded) have nearly twice the fatality rate of women.
- Men have at least twice the injury rate of women. This is true in every age group below 65.
- Smoke or asphyxia, alone or combined with burns, was the leading cause of death for civilians.
- Burns were the leading cause of non-fatal injuries.

Figure 10. Fire Death Rates By Race and Sex



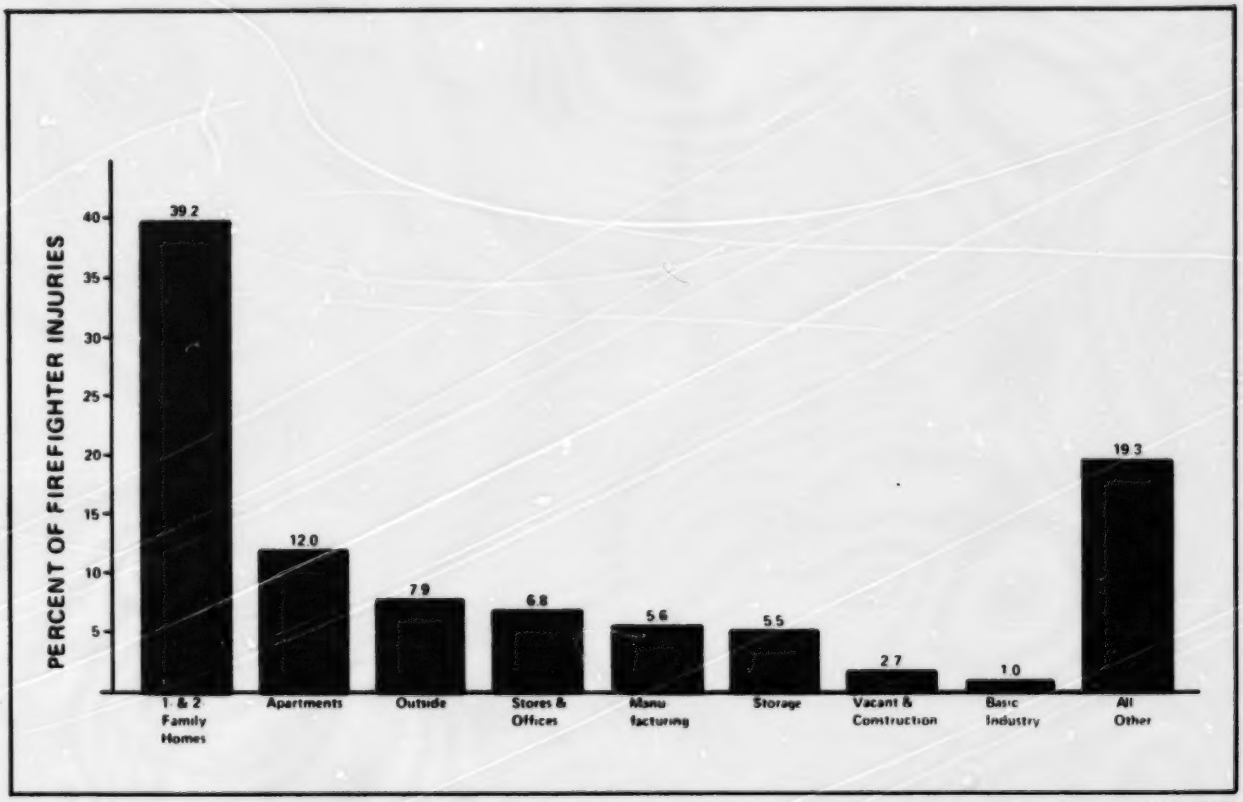
Source: NCHS, 1977 (Adjusted)

Firefighter Deaths And Injuries Remain High

We estimate that there were 164 firefighter deaths during 1978. Slightly over half were volunteer firefighters. Heart attacks accounted for just over half of the deaths, for both volunteer and paid firefighters. In addition, firefighters sustained an estimated 58,000 injuries from fire incidents during 1978, nearly two-thirds of all injuries associated with fires reported to the fire service. Putting it another way, at the fires the fire service attends, more firefighters get hurt than do people who have the fires! These statistics, compared to those of other professions, show that firefighting continues to be one of the nation's most hazardous professions.

The majority of firefighter injuries (52%) occur in residences, especially single family and duplex homes (Figure 11). This is because the majority of fires in structures occur in residences. Less hazardous situations are generally encountered in vehicle and outside fires.

Figure 11. Where Firefighters Are Injured



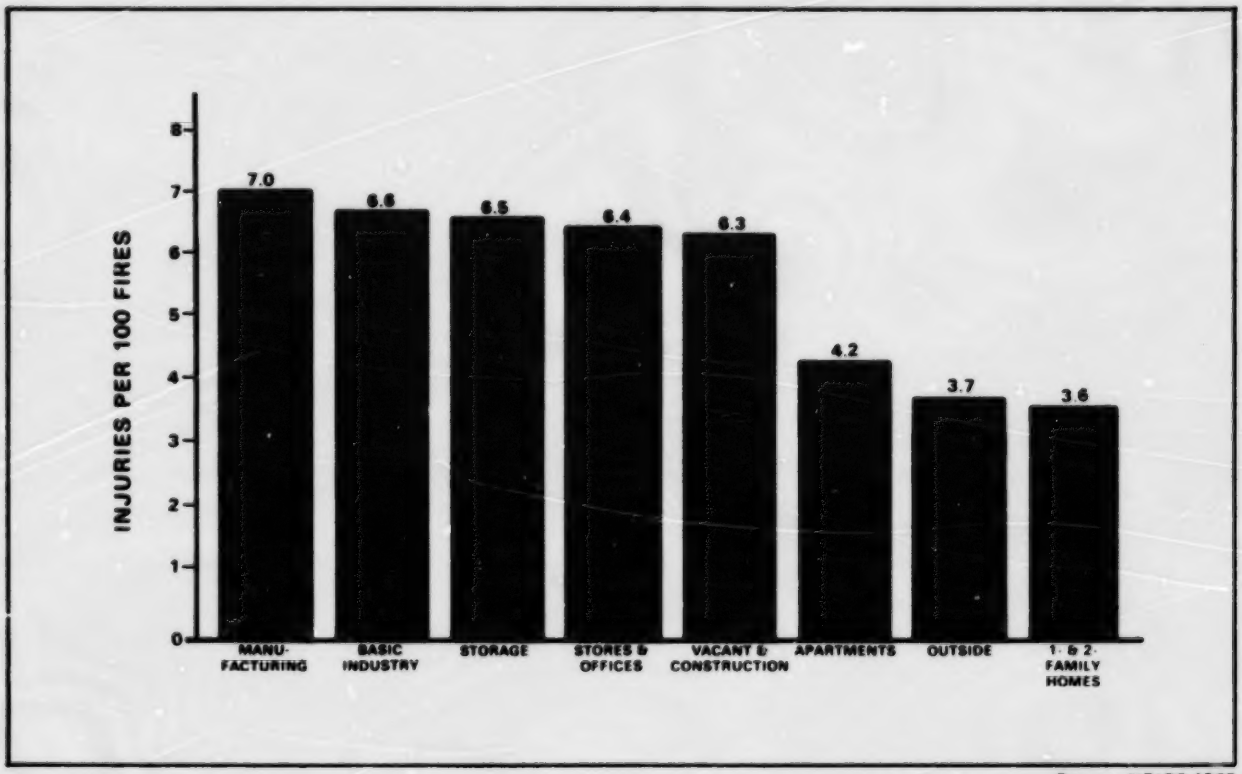
Source: NFIRS 1978

But residential fires are not the most dangerous ones for firefighters. The average number of injuries per fire shows which types of fires are most dangerous to fight. Figure 12 shows that fires in manufacturing, basic industry, storage, store/office, and vacant/construction properties present the greatest risk. The injury rates associated with these fires are nearly twice those for residential fires. These rates probably are high because these fires are usually larger than residential fires and frequently are of incendiary origin. The general floor plans and contents of these properties also are less familiar to firefighters than those they encounter in residences. And these properties tend to contain larger amounts of hazardous materials.

Most fires that injure firefighters injure only one or two of them. However, a small number of fires cause a disproportionately large number of injuries: for fires in which firefighters are injured, less than 10% of fires account for more than 25% of total firefighter injuries.

Individual fire departments should analyze their own most serious injury-producing situations and use that information in their training, prefire planning, and fireground tactics to reduce high injury rates.

Figure 12. Most Dangerous Occupancies For Firefighters



Source: NFIRS 1978

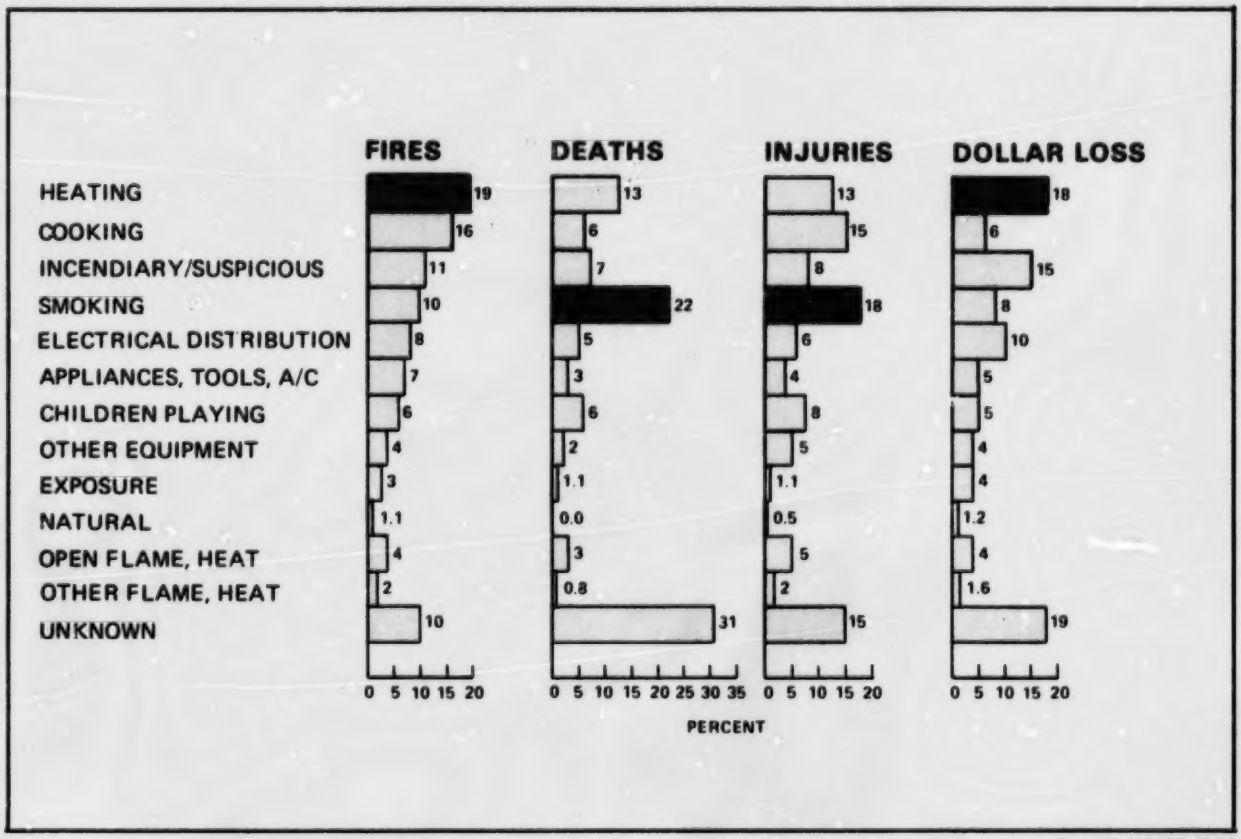
Causes Of Residential Fires

Residential fires continue to be the main source of U.S. fire deaths and must receive high priority in prevention programs if we are to reduce fire losses significantly. Roughly three-fourths of all fire deaths occur in residences.

Determining the most frequent causes of fires is important in targeting fire prevention and inspection programs. From Figure 13 we can see which causes account for the most fires and the greatest losses in residences.

In terms of the number of fires with known causes that occur in homes, heating and cooking fires are the predominant problems. However, it is smoking that causes the highest proportion of fire deaths and injuries. Heating-related fires are causing an increasing proportion of deaths nationwide. This is now the leading cause of fire deaths in the Southeast, where fixed room heaters and portable heaters are primary problems, and also in parts of the Northeast, where woodburning stoves are an increasing problem.

Figure 13. Causes Of Residential Fire Losses


FIRES
DEATHS
INJURIES
DOLLAR LOSS
HEATING
COOKING
INCENDIARY/SUSPICIOUS
SMOKING
ELECTRICAL DISTRIBUTION
APPLIANCES, TOOLS, A/C
CHILDREN PLAYING
OTHER EQUIPMENT
EXPOSURE
NATURAL
OPEN FLAME, HEAT
OTHER FLAME, HEAT
UNKNOWN
19 16 11 10 8 7 6 4 3 1.1 4 2 10
13 6 7 22 5 3 6 2 1.1 0.0 3 0.8 31
13 15 8 18 6 4 8 5 1.1 0.5 5 2 15
18 6 15 8 10 5 5 4 4 1.2 4 1.6 19
0 5 10 15 20
0 5 10 15 20 25 30 35
0 5 10 15 20
0 5 10 15 20
PERCENT

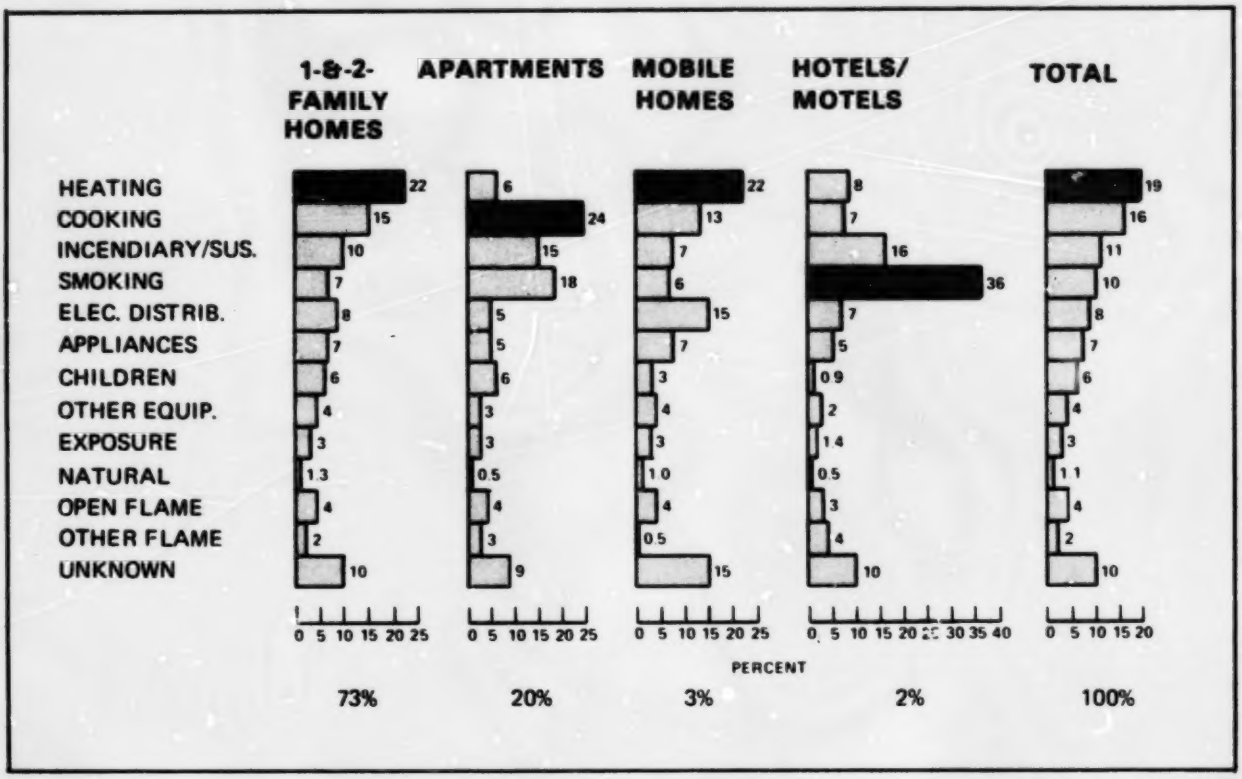
Source: NFIRS 1978

For dollar loss, heating is the leading known cause. Also for dollar loss, incendiary and suspicious fires are a close second which will surprise many people who consider arson a problem exclusively for business and industry. The residential arson problem is not limited to apartment houses either. Almost three-quarters of the incendiary and suspicious fires in residences are in one- or two-family homes!

For many fires the cause is listed as *unknown*. We do not know whether unknown-cause fires are distributed in proportion to other causes, or whether they are more likely to be due to a few specific causes such as arson. We urge states and individual fire departments to reduce the number of fires in the *unknown* cause category by upgrading training in fire investigation.

The nature of the residential fire problem also varies according to the type of housing — an important distinction to understand when targeting public education programs or inspections (Figure 14). In *single-family homes, duplexes,* and *mobile homes,* for example, the leading cause of fire is heating. Two-thirds of these heating fires are due to fixed room heating devices or to improperly installed or maintained chimneys and fireplaces.

Figure 14. Causes Of Fires By Type Of Residence



Source: NFIRS 1978

In *apartments*, on the other hand, which generally have centralized, professionally maintained heating systems, the heating fire problem is small. Instead, cooking is the leading cause of apartment fires. Food and grease ignited by stoves and ovens are the largest part of the cooking fire problem in apartments.

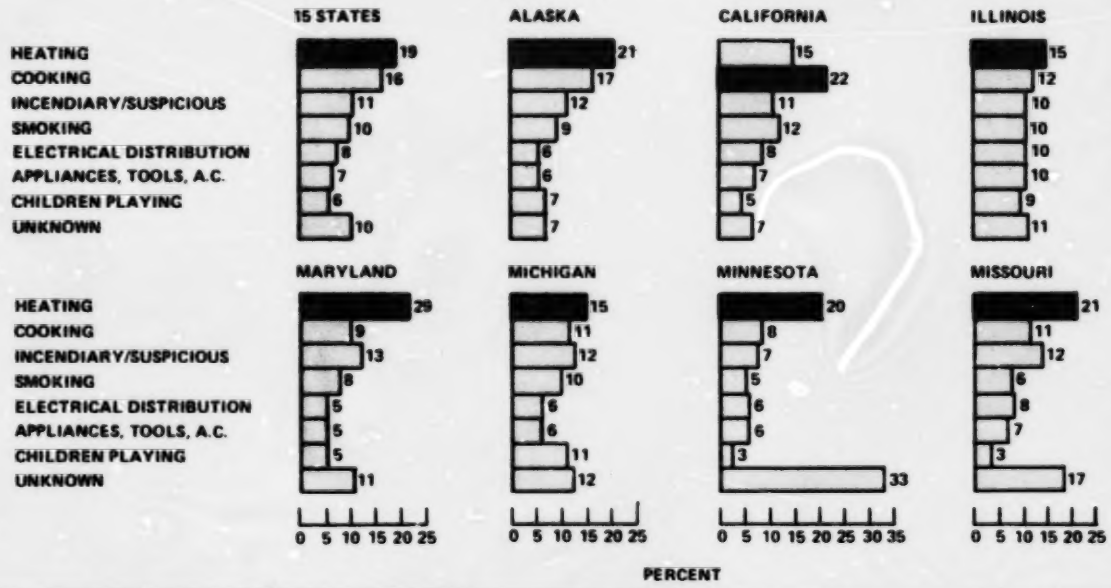
In *hotels and motels*, smoking is the leading problem. The particular problem is bedding ignited by cigarettes and other smoking materials.

The bottom of the chart shows that about three-quarters of all residential fires are in single-family homes and duplexes. Even though this proportion varies depending on the housing mix in a community and the socio-economic characteristics of people in different types of housing, we believe reducing the overall residential problem significantly requires addressing the single-family home problem.

Although mobile home fires make up only a small percentage of all fires and only a small fraction of the population lives in mobile homes, we know that the fire death rate for mobile homes is exceptionally high. So mobile home occupants are a high fire risk group. This illustrates the importance of looking at all loss measures, not only the measure of the number of fire incidents displayed in Figure 14.

The nature of the residential fire problem also varies by community size. In rural areas, heating is far and away the leading cause of

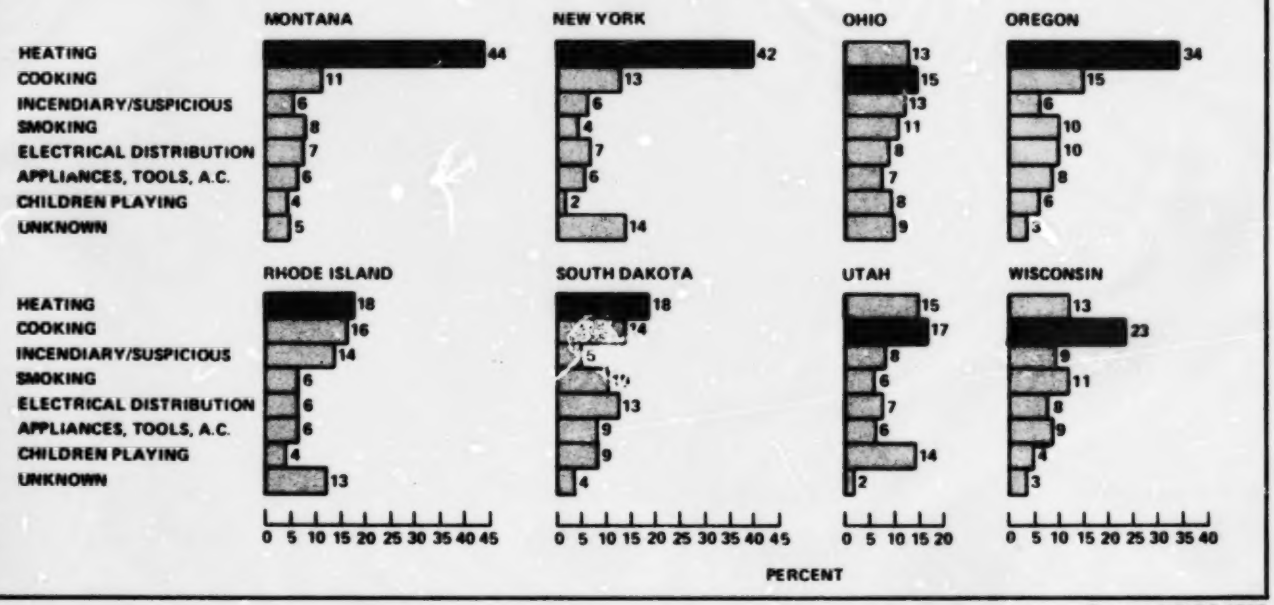
Figure 15. Causes of Residential Fires In 15 States



residential fires (34%). But in large cities, cooking and incendiary/suspicious fires are the leading causes (each 15%). These differences result mainly from differences in the mix of housing that occurs in large cities and rural areas, with cities having a much larger apartment population. However, when comparing causes of fires for the same type of dwelling in rural and urban areas, there also are differences. One important example is that cities tend to have more incendiary/suspicious and smoking fires in private homes than do mid-size towns and rural areas.

Cause profiles of residential fires also differ from state to state (Figure 15). This is partly due to state characteristics such as differing proportions of urban versus rural areas and single-family homes versus apartments. This is another reason why it is important to analyze your own state's or city's problem. In 11 of the 15 states in the figure heating is the top ranking *known* cause of home fires. Note also that the percent of *unknown*-cause fires varies greatly from state to state.

Information on the *causes* of fire in the United States now comes primarily from the National Fire Incident Reporting System (NFIRS). (This and other sources of fire data are described on page 25.) The NFIRS program provides more detailed information than presented above on fire causes, such as type and form of material ignited, form of heat of ignition, and ignition factor. The broad categories shown in Figures 13, 14, and 15 just make it easier to view the fire problem as a whole. Much more specific information on fire causes is presented in the full report *Fire in the United States, Second Edition.*



Source: NFIRS 1978

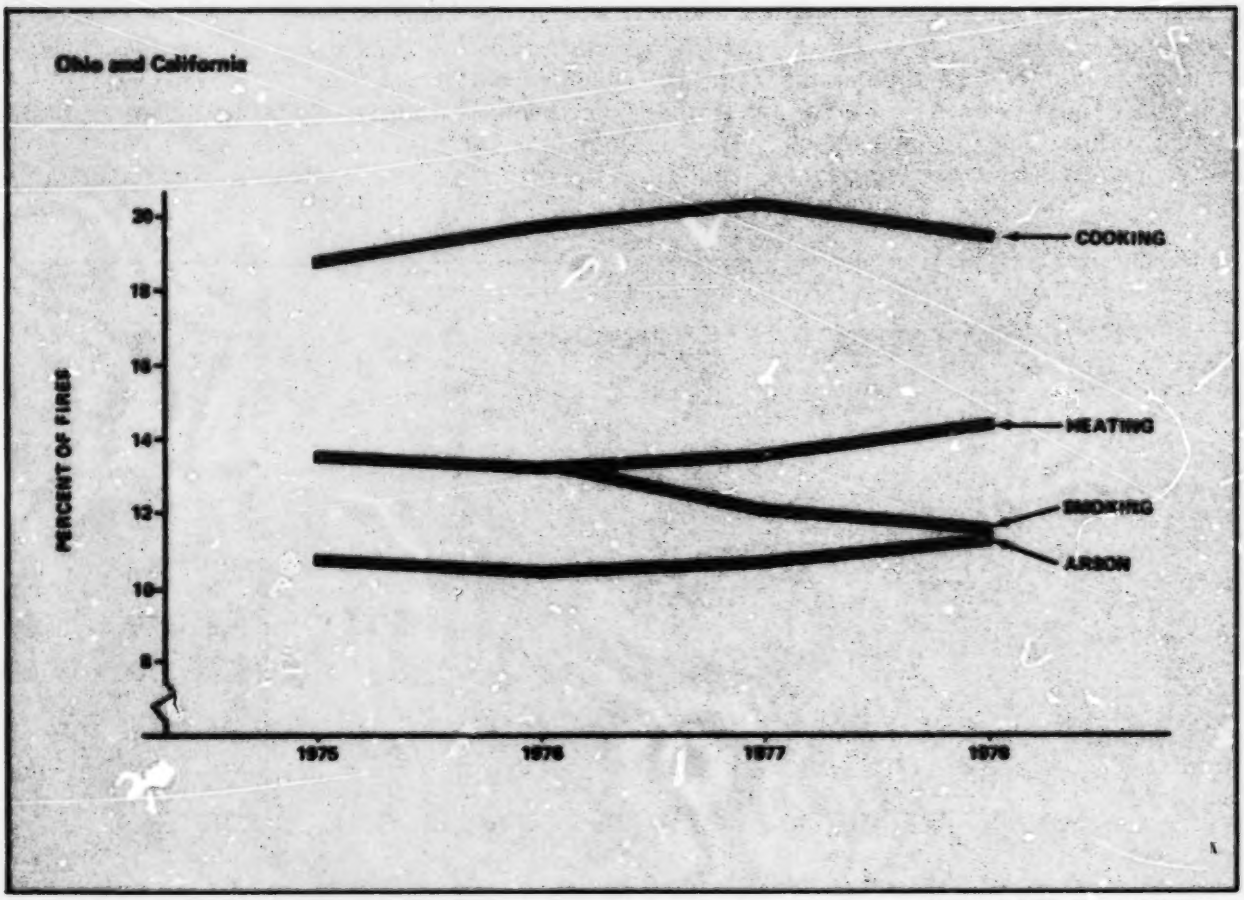
Major Causes Are The Same—Heating Problems Grow

While heating has increased somewhat as a problem, the big picture has been remarkably stable: the same group of causes remain at the top year after year.

The 4-year data from California and Ohio (the only states in NFIRS this long) in Figure 16 shows that cooking, heating, smoking, and incendiary/suspicious have remained as the leading causes in these states and only small changes have occurred.

However, as mentioned earlier, there is growing evidence from state and local comments and from special studies that heating is a more rapidly increasing problem in some areas—Northeast and Southeast—for which Ohio and California would not be representative.

Figure 16. Trends In Leading Causes Of Fire



Source: NFIRS, Ohio and California

Indirect Residential Fire Losses Are Significant

Fires in homes often cause great emotional suffering, loss of irreplaceable possessions, and substantial dollar loss beyond the cost of replacing the things that have been burned or damaged by smoke or water.

The "indirect" monetary loss from fires in homes in the United States totals more than $300 million annually. Some type of indirect loss, whether it is the cost of temporary shelter, extra meals, missed work, or legal, medical, or funeral expenses is incurred in roughly one-fourth of all reported residential fires.

Temporary shelter costs are the largest portion, accounting for nearly 45% of the $300 million. Medical costs are second, accounting for approximately 24%, and costs due to missed work are the third largest, representing about 12% of these indirect losses.

Perhaps even more significant are the intangible and hard-to-measure losses. Almost 120,000 persons a year experience emotional problems from residential fires. Nearly one-third of these people consider their problem "very serious." Also, more than 100,000 households a year lose pets and irreplaceable family photographs and heirlooms.

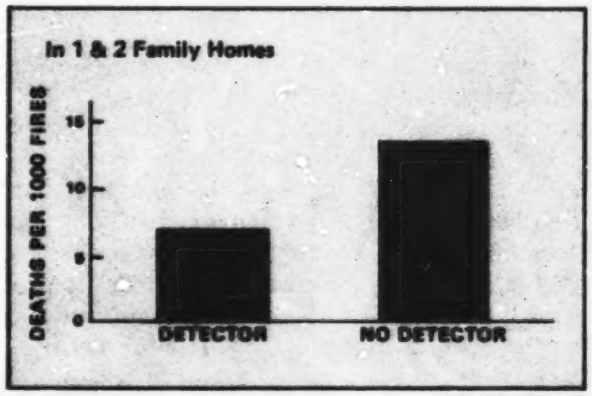
Unreported Residential Fires Should Not Be Disregarded

Fires which are not reported to the fire service are not always trivial. We do not have current statistics on how many fires go unreported, but according to the National Household Fire Survey (1973-1974) nine out of ten household fires are not reported. The majority of these unreported fires involve cooking and are small. However, many are not. For instance, the survey showed that almost half of the fires that cause injuries severe enough to result in time lost from work are not reported to the fire service. Another nationwide survey is needed to gauge whether these findings still hold or whether the percentage of fires reported to the fire service has changed recently. However, because of fiscal constraints, none is planned. Local governments may wish to conduct their own surveys.

Smoke Detectors

Evidence is mounting that smoke detectors save lives and property. There have been anecdotal accounts of this for years, and now we are beginning to be able to quantify the life safety effectiveness of detectors. NFIRS data shows that when a fire occurs, the risk of dying in a home where detectors are not installed is almost twice the risk in homes where detectors are installed (Figure 17). Although part of this difference may be due to the behavior characteristics of people who have detectors—

Figure 17. Life Safety Effectiveness Of Detectors



Source: NFIRS 1977-78

they may be more fire safety conscious or know more about what to do if a fire occurs—a good part probably is due to the margin of life safety that detectors provide.

Unfortunately, the households which have the greatest risk of fire tend to have the least detector protection. Detectors were present in only one in ten of the homes that had reported fires during 1978! Yet about one in two homes had a detector according to a survey taken early in 1980. We strongly urge the installation of detectors in homes that do not have them. We also urge that homes with detectors keep them working and add more—at least one for each level and for each group of bedrooms.

Causes of Non-Residential Building Fires

Although non-residential building fires accounted for only 12% of all fires, 10% of all deaths, and 13% of all injuries in 1978, they accounted for 43% of dollar losses.

Arson continues to be the foremost cause of this dollar loss as well as the major cause of the non-residential deaths and injuries. Arson is the leading cause of fire in most types of non-residential properties—education, institution, public assembly, storage, and vacant/construction.

Some types of non-residential property have leading problems other than arson. For example, cooking continues to be the major cause of fire in eating and drinking establishments. Electrical distribution remains the principal fire cause in stores and offices. Process equipment is the leading fire cause in manufacturing plants. Because the leading fire cause varies by property type, a different emphasis in fire inspection and prevention programs is needed for each category.

Each Community Should Analyze Its Own Problem

Because of variations over time and differences from one community to another each community should examine its own fire problem in order to correctly target its own prevention measures. Even though one city in a state may have determined the leading causes of its fires, a neighboring city should not rely on those results as indicative of its own situation. There often are large differences in the fire problem between different communities, even for those in the same state and with the same population size.

On the other hand, the leading national, or regional, or state fire loss causes result from their being the leading causes in lots of communities. In the absence of better local information, it is a "good guess" to use fire loss information from communities similar to your own.

Fire Data Is Being Used To Reduce Losses

Fire chiefs, prevention officers, code administrators, researchers, government officials, and others concerned with the Nation's fire problem are now using data on fire incidents from the National Fire Incident Reporting System as well as other sources. In each community, making sure that fire prevention efforts are targeted accurately at problems causing the most damage—deaths, injuries, or dollar loss—is perhaps the most important next step.

At the national level, a variety of Federal agencies have used the newly available fire data to help make decisions on consumer product regulations (both to stop unnecessary regulation and to support needed regulation), shape

legislation, and target research projects. For example, the Consumer Product Safety Commission, in considering flammability regulations for upholstered furniture, used NFIRS data as well as National Fire Protection Association data showing that upholstered furniture is the most common product first ignited in fatal residential fires. NFIRS data dealing with causes of mobile home fires has shown the U.S. Department of Housing and Urban Development that the provisions of the 1976 Federal Mobile Home Construction and Safety Standard are helping reduce fire problems in those homes.

The Center for Fire Research, National Bureau of Standards, has used the national fire statistics to set priorities and plan its research. The results of that research, in turn, contribute to our understanding of the nature of the products, construction and design features, and other factors which impact the ignition and spread of fires.

Other organizations also are using fire data to improve products, codes and standards, and fire protection equipment. The National Fire Protection Association, Boston, Massachusetts, is using NFIRS data while developing fire models and for supporting their fire protection standards committees.

Many fire departments have developed specific uses for their data—scheduling shifts, targeting inspections and public education at unique local problems, preparing annual reports, arguing for budgets, etc. These ideas are being shared among departments participating in NFIRS by means of the *NFIRS News*, at the annual NFIRS Users Conference attended by each state, and at conferences now held by a number of individual states for their participating departments.

In addition, both the national fire data figures and figures from local communities where they are available are being used to give the general public a greater sensitivity to dangers from fire.

Reporting fire data and understanding the nature of the fire problem is an essential step in reducing the Nation's fire losses. When all levels within the fire sevice take this step, we will be better able to prevent injuries, loss of life, and the destruction of property in the days ahead.

A Few Words On Data Sources And Data Accuracy

It is important to make clear the nature of the data on which our analysis is based. In measuring the overall size of the U.S. fire problem, we can place most confidence in the fire death estimates. We place somewhat less confidence in estimates of fire incident rates, followed by the estimates of direct dollar loss. The injury estimates for both civilians and firefighters are the least reliable statistically but are presented to give at least a rough idea of the seriousness of this part of the problem.

Fortunately, we now have a much better understanding of the specific characteristics of the Nation's fire problem that we need to know to target and evaluate programs. This progress has occurred because of the expanded scope of the National Fire Incident Reporting System on which much of our analysis is based. Fifteen states had submitted at least one full year of data and the NFIRS data base included more than 1,000,000 fires (440,000 from 1978 alone) when we began our analysis for the second edition of *Fire in the United States*. Thirty-eight states, plus the District of Columbia, are at various stages of developing NFIRS at this time, so the future holds even further promise for improvement.

We have also expanded our analyses of data from the National Fire Protection Association, the National Center for Health Statistics, and other sources. We use data from sources other than NFIRS for three reasons. First, no single source has all the information we need. Second, we often can make better estimates by combining data from two or more sources. And third, we can determine the reliability of our estimates better when more than one source is available to cross-check accuracy. This cross-check is especially valuable now, while the United States is still in the early stages of developing an improved fire data system and while we are establishing baseline information against which future changes can be measured.

Sources of fire data used in this report include the following: National Fire Incident Reporting System data from California and Ohio for 1976 through 1978; NFIRS data from Alaska, Maryland, Minnesota, Missouri, New York, and Oregon for 1977 and 1978; NFIRS data from Illinois, Michigan, Montana, Rhode Island, South Dakota, Utah, and Wisconsin for 1978; State Fire Marshal annual reports from many states; National Center for Health Statistics death certificates; National Fire Protection Association fire department surveys for 1977 and 1978; and National Fire Data Center surveys and special studies on selected topics.

For each specific topic the latest accurate data available was used for analysis. Most of our facts and figures describe the fire problems of calendar year 1978, although some are from 1977 where 1978 data was not available yet. We have indicated in the text and on the charts and tables the sources and dates of the data presented so that anyone quoting the findings or doing further analysis will know what base they are using.

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